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ABSTRACT

An experiment was conducted to test the hypothesis that the remediation of negative emotion will be most effective when the remedial procedure matches the experience or cognition that induced the negative state. Other hypotheses examined were (1) that negative states induced by cognitive reflection related to the self would be resistant to remediation and (2) that changes in emotional expressions may make it appear that a negative state has been effectively remediated when lingering effects on behavior and cognition indicate otherwise. Negative emotional states were induced in 150 second-grade children by one of four processes involving social rejection content: cognition that focused on the self (thinking about being rejected) or a peer (thinking about a peer's being rejected) or experience relating to the self (actually being rejected) or to a peer (observing a peer being rejected). These processes were followed by a positive remedial induction (social acceptance) whose process did or did not match that of the negative induction. Except for negative self-cognitions, it was found that the behavioral and cognitive consequences of negative emotion were alleviated when the positive remediation was of the same type as the original induction. Regardless of their type, emotional expressions were consistently positive following remediation. (Results are discussed in terms of differing processes for maintaining negative emotion as a function of the character of induction, and implications for understanding clinical depression in children are noted.) (Author/RH)

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The Effects of Affective States Induced via Cognitive, Experiential, and Vicarious Procedures on Behavior and Cognition.

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Abstract

The present experiment tested the hypothesis that the remediation of negative emotion will be most effective when the remedial procedure matches the experience or cognition that induced the negative state (process-specificity hypothesis). Other hypotheses examined were that negative states induced by cognitive reflection related to the self would be resistant to remediation, even by a same-process positive procedure, and that changes in emotional expressions may make it appear that a negative state has been effectively remediated when lingering effects on behavior and cognition indicate that it has not. Negative emotional states were induced in second-grade children by one of four processes, all of which involved social rejection content: cognition that focused on (a) the self (thinking about oneself being rejected by a peer) or (b) another person (thinking about a peer being rejected); or experience that related to (c) oneself (actually being socially rejected) or (d) observing another (vicarious: seeing a peer be socially rejected). These inductions were then followed by a positive, remedial induction whose content was the reverse (social acceptance) and whose process did or did not match that of the negative induction. As predicted, except for negative self-cognitions, it was found that the behavioral (altruism) and cognitive (performance on a block design task) consequences of negative emotion were alleviated when the positive remediation was of the same type as the original induction. Emotional expressions were consistently positive following remediation, regardless of their type. The results are discussed in terms of differing processes for maintaining negative emotion as a function of the character of induction, and the implications for the understanding of clinical depression in children are noted.

Factors governing the effective remediation of negative affect and its cognitive and behavioral consequences

The idea that emotion can be produced by thinking, experiencing, or observing is not a new one. Philosophers, poets, and other reflective people have long considered the possibility that one's thoughts, attitudes and expectations --- in short, one's cognitions --- may play an important role in the production and maintenance of affective states. In addition, such thinkers have long espoused the power of individuals to control their emotional reactions to negative occurrences by stoic acceptance, the elimination of irrational expectations, or therapeutically focusing on one's 'blessings.' However, even the staunchest supporter of such a viewpoint readily concedes that experiences other than purely cognitive ones may produce emotional reactions. A variety of experiences such as physiological distress or the loss of a loved one may be capable of producing powerful affective consequences with minimal cognitive inducement. In noting such emotion inducing experiences, those that involve the observation of emotional responses in others also quickly come to mind. The phenomenological experience of a parent observing a progeny's anguish or the contagious laughter of a group of adolescents offer strong natural support for the idea tnat one's emotions may have important affective consequences for others as well.

There is ample experimental evidence that cognitions, especially ruminations about affectively toned events, may have powerful influences on mood states and associated behaviors. The emotional states resulting from such cognitive inductions of emotion have been found to influence self-gratification and altruism (Barden, Garber, Duncan & Masters, 1981; Cialdini & Kenrick, 1976; Moore, Underwood & Rosenhan, 1973; Rosenhan, Underwood & Moore, 1974; Underwood, Froming & Moore, 1977; Underwood, Moore &

Rosenhan, 1973), aggression (Harris & Siebel, 1975), resistance to temptation (Fry, 1975), expectancies for future outcomes (Masters & Furman, 1976), memory (Barden et al., 1981; Bower, 1980; Bower & Cohen, 1982; Isen, Shalker, Clark & Karp, 1978), cognitive processing (Barden et al., 1981; Masters, Barden & Ford, 1979), and facial expressions of affect (Barden et al., 1981; Carlson, Felleman & Masters, 1983; Masters et al., 1979). Although these effects are reliable and powerful, the processes by which such effects are achieved, maintained, and eventually remediated are far from clear.

Even though there is a significant and growing literature demonstrating the effectiveness of cognitive affect-inducing procedures, there is still a paucity of research concerning the induction of various affective states in children (or adults) through the manipulation of controlled experiences, especially those of a social nature. This is remarkable given the gamut of potential experiences that may influence children's affective states. The most relevant available data come from several studies investigating the effects of success and failure experiences on young children (Krebs, 1970; Isen, Horn & Rosenhan, 1973), and even this work has not verified children's actual emotional reactions to their experiences.

Little has been done to chart children's emotional reactions to actual experiences. Furman and Masters (1980) found that social reinforcement from peers tended to elicit expressions of positive affect and social punishment indications of negative affective reactions. Suggestive evidence for other relationships between actual experiences and children's emotional reactions was reported in an interview study by Barden, Zelko, Duncan & Masters (1980). As early as the preschool years, children are aware that experiences such as success or nurturance from others induces happiness, and that other experiences such as failure or social rejection elicit negative affect. Thus far, however, there has been little research manipulating children's actual

experiences and tracing the effects upon emotion per se and on consequent behavior and cognition.

In addition to cognitions and direct experience as potential sources of affect, another process by which affect may be aroused is the observation of emotions in others, i.e., vicariously (or empathically) induced affect. Vicariously induced affective states have been postulated to be a primary component of altruistic behavior through the empathy such affect may generate (Hoffman, 1975). Vicarious processes have also been hypothesized to contribute to the acquisition and maintenance of clinical depression (Coyne, 1974). Nevertheless, despite the centrality of vicarious processes to such important theoretical issues, and despite evidence that even young children are capable of recognizing affective states in others (Carlson, Felleman & Masters, 1983; Felleman, Barden, Carlson, Rosenberg & Masters, 1983), research is rare that offers a direct test of young children's developing empathic responsiveness in terms of their own affective responding.

An important corrollary to questions relating to the determinants of emotional states concerns the processes governing their effective remediation, especially in children. This is particularly important with respect to negative emotions that may be aversive and have debilitating effects on behavior and cognition (Barden et al., 1981; Masters et al., 1979). There has been little investigation of effective procedures to remediate negative affective states, nor is much known about the processes by which children may learn to control their negative affective reactions to social experience (Masters, Ford & Arend, 1983). The growing interest in depression in children Kashani, Husain, Shekim, Hodges, Cytryn & McKnew, 1981; Rutter, Izard & Read, in press), coupled with the success of the cognitive model of depression in managing affective disorders (Beck, Rush, Shaw & Emery, 1979; Hollon & Beck, 1979), underscores the importance of understanding the processes by which emotional states may be remediated.

In a recent study, Barden et al. (1981) examined the interactive effects of two cognitive inductions conducted successively. Although each induction produced immediate and appropriate changes in children's facial expressions, only the first induction had an eventual effect on behavior. These findings suggest that the initial induction may have prepared or "inoculated" children so that their behavior was uninfluenced by the second induction even though their facial expressions were. It is also possible that the failure to find a behavioral impact from the second induction indicates that (a) cognitively induced affective states are not readily subject to remediation, or (b) that cognitive inductions are effective when no prior state exists but are not effective in remediating ongoing emotional states. In any event, it seems clear that altering existing affective states is quite a different matter from inducing them, and the processes that govern the ebb and flow of affective changes over time are at present only poorly understood.

In an attempt to assess children's knowledge of affective change processes and perhaps discover a clue to a successful remediation procedure, we conducted an interview study in which 30 eight and nine year old children were asked to specify the most powerful affective experiences they had encountered and, further, to indicate how they might maintain the positive states and remediate negative ones (Barden, Leiman, Garber & Masters, Note 1). Particularly noteworthy was a finding that the types of activities children nominated to remediate aversive affective states tended to be consistent in character with the initial experience by which the aversive state had been induced. For example, aversive social experiences were to be altered by positive social encounters, while aversive vicarious experiences were to be altered via positive vicarious experiences (e.g., if their friend's brand new bicycle were damaged, they nominated having the friend receive a brand new one). These findings led to the hypothesis that the character or conditions of origin for an affective state may constrain the range of effective

remediating strategies. This has been termed a process-specificity hypothesis stating that affective experiences are best remediated by affective experiences of the same type or process. An exception or corrollary to this rule, drawn from the findings of Barden et al. (1981), is that cognitively induced affective states, including perhaps those induced otherwise but maintained by a cognitive loop (e.g., continued negative self-reflection), are particularly resistant to remediation, even by a procedure that is similarly cognitive.

Other recent research also supports the notion that the character or originating conditions for an affective state may have important implications for the consequences of that state. Barnett, King and Howard (1979) asked children to generate sad, happy or neutral thoughts concerning themselves or other children. In a subsequent test of altruistic behavior, children who thought a sad thought about themselves were significantly less generous than were children who thought a sad thought about others. Thus, the focus of an affective state (in this case, self vs. other) is another important variable influencing the consequences of induced affective states and may also be important in their remediation.

The present investigation was prompted by several of the points discussed above, to wit: 1) while recent research has amply demonstrated that cognitive induction procedures are reliable means of inducing affect in children, experimental evidence that direct or vicarious experience also induces emotional states is generally lacking; 2) there is evidence that remediation of the effects of affective states on cognition and behavior may be influenced by the character of the induction procedure; and 3) the only experimental attempt to remediate cognitively induced negative affective states failed to provide behavioral remediation.

To address these issues, a study was designed in which negative affective states were induced in children by one of several different types of

cognition or experience. For one cognitive induction procedure, children thought about negative events that might befall them (Cognitive-Self), while in a second cognitive procedure children dwelled upon events happening to other children (Cognitive-Other). Two other negative induction procedures were employed, each involving a type of children's experience. One procedure provided children with an actual aversive social experience (Experience-Self), and the other provided children with an occasion to observe a similar aversive experience occurring to another child (vicarious Experience-Other).

These four types of induction procedures were then followed by potentially remediating cognitions or experiences. Each of the potential remediations involved a positive version of (a) the same cognitive or experiential procedure used in the initial negative induction for that child, or (b) one of the remediation procedures that did not match the cognitive or experiential nature of the negative induction for that child. By using a full factorial crossing of all induction-remediation pairs, the potential interactions of all types of negative induction and positive remediation were explored. In addition, a number of comparison groups were included to reflect the effects of single (unremediated) negative affective inductions and of single positive inductions of the various types.

To assess the effects of the initial negative inductions and of the degree to which they were eventually remediated, dependent variables were included that reflected both cognition and social behavior. Specifically, measures were taken of children's subsequent altruistic behavior and of their cognitive abilities as measured by performance on a block design task. In addition, self-reports of affective social experience were recorded and videotapes were made of children's facial expressions throughout the procedures. The videotape samples were rated for expressed affect to index

the children's affective states at various times throughout the experiment and to provide validations for the procedures used to induce and remediate affect.

There were several predictions tendered:

1) children receiving a single negative affect induction of any type will show decreased cognitive performance, decreased generosity towards other children, increased self-reports of negative affect, and facial expressions indicative of negative affect;

Corrollary: there will be one exception to the above, specifically, that children receiving an initial negative vicarious (Experience-Other) induction will show increased levels of generosity (Hoffman, 1975);

2) the most effective remediation of negative affect and its cognitive and behavioral consequences will occur when the remedial induction is of the same type (cognitive vs. experiential) and focus (self vs. other) as the negative induction (for example, children receiving an initial Experience-Self induction and a positive remediation induction of the same type and focus will not show the decreases in cognitive performance or generosity that will characterize children who experienced the same negative induction and a "remedial" one that is positive, but of a different type and/or focus);

Corrollary: an exception is that the Cognitive-Self induction may prove to be particularly resistant to remediation, even by a positive induction of similar type and focus (Barden et al., 1981); and

3) finally, expressed affect and self-reports of affective state will confirm the validity of the initial negative affect induction, regardless of the character of the induction;

Corrollary: following remediation, children's expressed and reported affect will be less negative than after a single negative induction even when the character of the negative and positive affect inductions are dissimilar (i.e., even when the cognitive and behavioral consequences of

a negative affective state are not effectively remediated by a positive induction, expressed and reported affect will appear to have changed).

Method

Subjects and Experimenters. Subjects were one-hundred fifty second grade children (7 and 8 years old), evenly divided by sex, from several suburban elementary schools. All children were seen by two experimenters, assigned randomly from a pool of four university students. The sexes of subjects and experimenters were counterbalanced across all conditions.

Experimental setting. The experiment was conducted in an empty classroom within the school building. The classroom setting included a long table on which was placed a can with a slotted top. A large sign on the can read "Money for Other Children" (Rosenhan et al., 1974). A video camera disguised as a movie projector was placed five feet away, facing the child's seat, to record the children's facial expressions at designated times during the session. Also on the table was an "intercom-speaker" that was ostensibly connected to the next room but was actually connected to a hidden tape recorder. An envelope with 25 pennies on top was also clearly visible on the experimental table.

Procedural overview. The child was brought into the room by the first experimenter (E-1: the affect inducer) and introduced to the second experimenter (E-2: who would administer the cognitive and behavioral dependent variables). At this time the child received instructions for the tasks that followed. E-2 then left the child alone with E-1, who instructed the child about the cognitive affect induction procedure or arranged for the affect induction experience, depending upon the condition. Before beginning, E-1 unobtrusively made a 30-second video record of the child's facial expressions for a pretreatment baseline. E-1 then began the initial procedure to induce negative affect (or positive affect, in the comparison conditions having only

a single positive affect induction). Following this, another 30-second video record was taken to assess the effects of the first induction. Then, in the experimental conditions, E-1 immediately provided a second (positive) affect induction and made a third video record of the child's facial expression.

At this point, E-2 reentered the room and E-1 left. E-2 then proceeded to administer the cognitive task (block design) and a fourth video record was made to assess any affective impact of work on that task. At this point, E-2 announced that s/he had "some work to do in the next room,", repeated the instructions for the altruism task, and left the child alone to perform the task. Exactly one minute later, E-2 reentered the room, administered a series of questions, and then made a final (fifth) video record of the child's facial expressions to assess any affective changes as a consequence of the altruism task.

Before the experimental session was terminated, the E-2 gave the child all potentially remediating affect inductions to insure that the child returned to the classroom in a positive affective state. The entire procedure required approximately 15 minutes per child.

Experimental and Comparison conditions. In an earlier study, children had nominated several types of experiences as powerful inducers of affect in natural settings (Barden et al., Note 1). Eight affect induction procedures were designed, four negative and four positive. These all represented the particular theme of social rejection or acceptance that children had commonly nominated as affect inducing in the earlier study. The four negative or positive inductions reflected all possible combinations of two types (cognitive vs. experiential) and two foci (self vs. other).

In the Cognitive-Self (C-S) induction, children heard a story about a situation "that could happen to you." It concerned rejection by a peer and the subsequent loss of a play situation that "is only fun if two children play

it together." The child was then instructed to think about this story for a 30-second period.

In the Cognitive-Other (C-O) induction, children heard a similar story, but the story was clearly defined as an event that had occurred to a similar age child in that very school. In this condition the child was also instructed to think about the story for a 30-second period.

In the Experience-Self (E-S) induction, children were involved in an actual experience similar to the story outlined above. The subject was seated next to an "intercom" that was connected to a tape recorder controlled by the experimenter. The experimenter used the "intercom" to speak to a child of the same sex in the next room. The taped reply was a rejection of an opportunity to play with the subject in a game that was "only fun if two children play it together." The subject was then asked to wait for 30 seconds while E-1 "did some work."

In the Experience-Other (E-O) induction, a vicarious experience was provided by having children view a videotaped enactment of the experience described above as performed by child actors from the company of a professional Children's Theatre. The subjects observed the videotaped segments on a 19-inch color television screen from a distance of three feet. Separate versions were produced for male and female children, with the performer always the same sex as the subject.

In the various experimental conditions, a potentially remediating positive affect induction followed the initial negative one. The substance of these remediations involved either a story concerning the self (C-S) or a peer (C-O) or a real (E-S) or vicarious (E-O) experience, in which the negative events were reversed. For example, the rejecting child stated that it was all an error, a case of mistaken identity, and that s/he would gladly play with the subject.

There were nine comparison conditions: four involved only the administration of the initial "negative" affect induction (by the four different methods); another four involved only the "second" positive induction (again by the four different methods); and a final comparison condition that involved no induction at all. These conditions were included to allow comparison-reference points to evaluate the effects of the various types c negative and positive (potentially remedial) inductions that were combined in the experimental conditions. The overall design was thus a 5 X 5 factorial matrix comprised of the various types of (a) initial, negative affect inductions (4 experimental, 1 comparison/no induction) and (b) second, positive affect inductions (4 experimental, 1 comparison/no induction).

Dependent variables

Cognitive measure. To assess the cognitive effects of induced and remediated affective states, a block design task, similar to that included in the WISC-R, was employed. This task has been used previously by researchers studying children identified as seriously depressed (Kaslow, Tannenbaum, Abramson & Seligman, Note 2) who reported deficits in depressed children's cognition speed, accuracy, and motor skills. Measures of children's performance included total correct (accuracy) and total time to complete the task (speed).

Behavioral measure: Altruism. Children's willingness to donate pennies constituted the behavioral measure of altruism. This measure was included to assess the behavioral consequences of induced emotional states and their potential remediation and was selected because it has been used in prior work with induced affective states. Instructions for the task were identical to those used in earlier research to insure comparability (Barden et al., 1981; Moore, et al., 1973; Rosenhan et al., 1974; Underwood, et al., 1973). The experimenter introduced the task by saying "We're only going to have time to let some of the children come to play this game. But we won't have time

for all of them, so they won't get a chance to earn money." The child was given 25 pennies that s/he could divide between her/himself and a can that was marked "for other children". The experimenter then announced that he had to leave the room to do some work and left the child alone for one minute to divide the pennies. The total number of pennies the child had placed in the can for other children (counted after the child had been excused from the experiment) constituted the altruism score.

Measures of expressed and self-reported affect

Ratings of children's videotaped facial expressions and their own self-reports provided independent assessments of subjects' affective states and allowed the validation of the affect induction procedures. The repeated taking of facial expressions at five separate times allowed an assessment of differences in emotional states at 1) pre-task levels, 2) following the initial affect induction, 3) following the second induction, 4) after completion of the cognitive measure, and 4) after completion of the behavioral measure.

Videotaped facial expressions were rated according to the categories used in previous research (Barden et al., 1981), specifically happiness, sadness, anger, disgust, fear, pain, and surprise. Two raters independently viewed the videotaped segments without knowledge of the hypotheses involved. They were trained to consider the behavioral components of a facial expression, its relative intensity, and the frequency and duration of its occurrence during each ten-second period. All ratings were on a 9-point scale, with 1 equated to the absence of a particular affect but not the presence of its opposite (e.g., 1 sadness did not imply any degree of happiness). Rater reliability was assessed for all subjects in terms of percentage of agreement and ranged from .82 to 1.00 across all affect dimensions. Since the present study focused upon the induction of negative

affect and its potential remediation, only ratings of sadness in facial expressions will be reported.

The self-report measure was taken following the completion of the behavioral tasks. Children were shown drawings of three faces, one smiling, one frowning, and one with a neutral expression. After seeing the faces, the child was asked to choose the face that best expressed how s/he was feeling after 1) the first induction, 2) the second induction, and 3) at the moment of questioning. For analysis, children's responses were given a numerical score of -1 (frown), 0 (neutral) or +1 (smile).

Results

Plan of analyses

A series of a-priori comparisons using Student's t-test was employed to assess predicted effects for the various dependent measures. To assess the predictions of the effects of single negative inductions on subjects' behavior, several comparisons were made. First, conditions involving only a negative induction (Cells 5, 10, 15, 20; See Tables 1 or 2) were pooled and compared to the condition involving no induction (Cell 25). Second, conditions involving a single negative induction were pooled and compared to those involving only a single positive induction (Cells 5, 10, 15, 20 vs. Cells 21, 22, 23, 24). These comparisons were designed to determine whether or not the various types of negative and positive induction procedures had induced affective states with clear cognitive, behavioral, and expressive consequences.

Another series of a-priori comparisons was performed to assess the predictions regarding remedial effects of a positive affect induction following an initial negative induction. First, conditions containing a same-process remediation manipulation (Cells 1, 7, 13, 19) were pooled and compared to conditions involving a cross-process remediation manipulation (Cells 2, 3, 4, 6, 8, 9, 11, 12, 14, 16, 17, 18). Second, conditions

containing a same-process remediation manipulation were pooled and compared to the condition involving no induction at all (Cell 25).

Finally, contrasts were performed comparing each of the four conditions involving a same-process remediation procedure (Cells 1, 7, 13, 19) to the condition involving a single negative induction procedure of the same type (Cells 5, 10, 15, and 20, respectively).

In addition to a-priori analyses, a-posteriori tests were performed using analysis of variance procedures and Duncan's Multiple Range Test for follow-up comparisons.

Effects of negative affective states on cognition and behavior

Cognitive performance. Table 1 presents the cognitive performance scores, with the mean for accuracy above the line and mean for speed below the line in each cell. The number in the upper left corner of each cell serves merely as a reference. The general prediction that negative affect would interfere with cognitive performance was confirmed. A-priori comparisons indicated that across all types of induction, children who received a single negative affect manipulation were less accurate (made significantly fewer correct responses) than children who received no affect induction (M = 5.21 vs. 7.00, t = -2.66, df = 11.8, $p<.05$; Cells 5, 10, 15, 20 vs. 25)[1]. These children also took significantly longer to complete the task (M = 224 sec. vs. 191 sec., t = 2.07, df = 125, $p<.05$). Similarly, children who received a single negative induction (Cells 5, 10, 15, 20) made significantly fewer correct responses than children who received a single positive affect induction (Cells 21, 22, 23, 24) (M = 5.21 vs. 8.16, t = -6.31, df = 30.2, $p<.001$) and took significantly longer to complete the task (M = 224 sec. vs. 182 sec., t = 3.87, df = 23.1, $p<.001$).

A posteriori comparisons between scores obtained from children who received a single affect induction were performed to determine whether

negative inductions by various procedures had different effects on cognitive performance. There were no significant effects.

Insert Table 1 about here

Altruism. Table 2 presents the data for children's altruism in the various conditions. The general prediction that a negative affective state would decrease children's generosity was also confirmed. Compared to children in whom no affective state had been induced, children receiving a single negative induction contributed significantly fewer pennies (M = 1.89 vs. 4.83, t = -3.61, df = 11.6, $p<.01$; Cells 5, 10, 15 vs. 25). These children were also significantly less altruistic than were children who received a single positive affect induction (M = 1.89 vs. 6.50, t = -5.83, df = 17.3, $p<.001$; Cells 5, 10, 15, 20 vs. 21, 22, 23, 24).

For this variable there was a significant effect for type of negative induction. As predicted, children who experienced a single negative induction that was vicarious in nature (E-O) were significantly more altruistic than were children who experienced a single negative induction of another type (M = 3.30 vs. 1.98, t = 2.13, df = 8.1, $p<.05$; Cells 5, 10, 15, 20 vs. 20). However, a-posteriori comparisons using the Duncan test indicated that children receiving a vicarious negative affect induction were still less altruistic than children receiving no induction at all (M = 3.30 vs. 4.83, $p<.05$; Cells 20 vs. 25). This result indicates that altruism was not increased by a negative vicarious induction but merely was not decreased as much.

Insert Table 2 about here

Remedial effects of induced positive affective states

Cognitive performance. As noted above, a-priori comparisons compared remediation groups involving inductions of the same type (Cells 1, 7, 13, 19)

to all other remediation groups (Cells 2, 3, 4, 6, 8, 9, 11, 12, 14, 16, 17, 18). Results were generally consistent with the process-specificity hypothesis. Children who received a same-process remediation manipulation were significantly more accurate than children receiving a cross-process remediation manipulation (M = 7.5 vs. 6.7, t = -2.21, df = 17, p<.05) and took significantly less time to complete the task (M 188.50 sec. vs. 203.00 sec., t = 1.91, df = 21.3, p<.05).

To test the hypothesis that same-process positive affect inductions effectively remediated cognitive effects from the negative affect induction, a-priori comparisons were performed between each condition involving a single negative affect induction and the matching same-process remediation manipulation condition. The expectation that the C-S same-process remediation manipulation might not prove effective was supported. Children who received a negative C-S induction followed by a positive induction of the same type were no more accurate in their performance than were children who received a negative C-S induction only (t = .186, df = 3.1, n.s.) nor did they complete the task in less time (t = .547, df = 6.2, n.s.) (Cells 1 vs. 5, Table 1). Overall, children who received an initial C-S negative induction showed decreased performance on the cognitive measures regardless of which remediation manipulation they received.

Other a-priori comparisons between various types of negative inductions (Cells 10, 15, 20) and the respective same-process remediations (Cells 7, 13, 19) supported the process-specificity hypothesis. For example, children who received a negative C-O manipulation following by a positive C-O remediation were significantly more accurate than children receiving the negative C-O manipulation along (t = 2.78, df = 8.4, p<.05, Cells 7 vs. 10). Children receiving a negative E-S induction followed by a positive induction of the same type were significantly more accurate on the block design task than children receiving only a negative E-S manipulation (t = 2.34, df =

7.9, $p<.05$; Cells 13 vs. 15). Similarly, the children receiving a same-process E-O (vicarious) induction and remediation were significantly more accurate than children receiving only the negative E-O induction (t = 5.02, df = 5.7, $p<.01$; Cells 19 vs. 20). Finally, no significant differences in accuracy or speed of cognitive performance were found when contrasts were performed between same-mode remediation conditions and the conditions in which there was no affect induction (Cells 1, 7, 13, 19 each vs. 25).

A-posteriori comparisons indicated that several nonprocess-specific manipulations seemed to have remedial effects, primarily on children's accuracy. Cell comparisons using the Duncan test showed that children receiving either a C-O or an E-O negative induction followed by a positive E-S remediation were significantly more accurate than children receiving a negative C-O or E-O induction alone ($p<.05$; Cells 8 vs. 10 and 18 vs. 20, respectively). Finally, children receiving an E-O negative induction followed by a C-S remediation were both more accurate and completed the task faster than children who experienced only a negative E-O induction ($p<.05$; Cells 16 vs. 20).

Altruism. A-priori comparisons compared same-process remediation groups (Cells 1, 7, 13, 19) to all other remediation groups (Cells 2, 3, 4, 6, 8, 9, 11, 12, 14, 15, 16, 17, 18). Results for this behavioral measure were also consistent with the process specificity hypothesis. Children who received a same process remediation donated significantly more pennies than children receiving cross-process remediation (M = 6.1 vs. 3.0, t = -2.65, df = 20.6, $p<.05$, Table 2).

To test the hypothesis that the other same-process positive affect inductions effectively remediated the behavioral effects of a negative induction, a-priori comparisons were performed between the single negative induction conditions and those involving a same-process remediation. Again, it was found that children receiving a C-S manipulation were particularly

resistant to the effects of a subsequent positive induction. Even when a C-S negative induction was followed by a same-process remediation, children did not donate significantly more pennies than children receiving a negative C-S induction alone (t = .260, df = 9.2, n.s.; Cells 1 vs. 5). In all other conditions, the process-specificity hypothesis was supported. Children who received a negative affect induction followed by a positive one of the same type donated significantly more pennies than children receiving the negative induction alone (C-O inductions: t = 2.63, df = 5.1, $p<.05$, Cells 7 vs. 10; E-S inductions: t = 4.96, df = 7.8, $p<.001$, Cells 13 vs. 15; E-O inductions: t = 2.66, df = 6.9, $p<.05$, Cells 19 vs. 20). Finally, children who received a same-process remediation procedure were not significantly more or less generous than children who received no induction at all (t = 1.69, df = 15.8, n.s.; Cells 1, 7, 13, 19 vs. 25).

A-posteriori comparisons indicated that several nonprocess-specific manipulations also seemed to have remedial effects for altruistic behavior. Cell comparisons using the Duncan test showed that children receiving a negative C-O induction followed by a positive E-O remediation donated significantly more pennies than children receiving only a negative C-O induction ;($p<.01$; Cells 9 vs. 10). In addition, children receiving an initial negative E-S induction followed by a positive E-O induction were significantly more generous than children receiving a negative E-S induction alone ($p<.05$; Cells 14 vs. 15). Finally, for children receiving a negative E-O induction, all of the remediation procedures produced significantly greater altruism than that shown by children following a negative E-O induction only (all ps <.05; Cells 16, 17, 18 each vs. 20).

Expressed and self-reported affect following negative and remedial inductions

The general prediction was confirmed that affect induction and remediation procedures would influence children's facial expressions of

affect. Compared to children in whom no affective state had been induced, children who received a single negative affect induction were rated as appearing significantly sadder (M = 1.0 vs. 5.7, t = 8.05, df = 17.3, $p<.001$; Cells 25 vs. 5, 10, 15, 20). Such children also appeared significantly sadder than children who received a single positive induction (M = 5.7 vs. 1.5; t = 7.20, df = 17.3, $p<.001$; Cells 5, 10, 15, 20 vs. 21, 22, 23, 24).

Findings for children's self-reported affect following the first induction were consistent with those presented above. Compared to children in whom no affective state had been induced, children who received a single negative affect induction reported feeling significantly sadder (M = .60 vs. -1.00, t = 16.66, df = 15, $p<.001$; Cells 25 vs. 5, 10, 15, 20). Such children also reported feeling significantly sadder than children who received a single positive induction (M = -1.00 vs. -.04, t = 14.86, df = 19.1, $p<.001$; Cells 5, 10, 15, 20 vs. 21, 22, 23, 24).

Consistent, again, with the process-specificity hypothesis, analyses of facially expressed sadness and of self-reported affect following both affect inductions revealed no significant differences between children who received a same-process remediation procedure and children who received no affect induction (for expressed affect, M = 1.60 vs. 1.00, t = 1.66, df = 12.7; for self-reported affect, M = 1.20 vs. 1.00, t = 1.07, df = 10; Cells 1, 7, 13, 19 vs. 25).

To test the hypothesis that the same-process remediation procedures effectively remediated the effects of the negative affect inductions upon facial expressive behavior, a-priori comparisons were performed between conditions involving only a single negative induction and those involving a same-process remediation. All comparisons supported the process-specificity hypothesis: children who received a negative induction followed by a positive remediation of the same type appeared significantly less sad than children who

received a negative induction only (C-S: t = 4.19, df = 5, p<.05, Cells 1 vs. 5; C-O: t = 5.08, df = 5, p<.01, Cells 7 vs. 10; E-S: t = -3.08, df = 5, p<.05, Cells 13 vs. 15; E-O: t = -2.59, df = 5, p<.05, Cells 19 vs. 20). Similar analyses for mean levels of self-reported affect were totally consistent with the above (all t's >-6.70, df = 5, p<.001), with all comparisons indicating that children who received a same-process remediation procedure reported feeling significantly less sad than children who received a negative induction only.

The above results regarding the remedial effectiveness of same-process inductions requires major qualification. While same-process inductions tended to be more generally effective in remediating the effects of negative affect on cognitive and behavioral consequences, there was no indication that they were more effective in changing the effects of a negative induction on facial expressions or self-reported affect than were positive inductions of a different type from the initial negative induction. To test the discriminative validity of the process-specificity hypothesis for the remediation of expressed and self-reported affect, a-priori comparisons were conducted between levels of sadness expressed or reported by children who received a same-process remediation procedure (Cells 1, 7, 13, 19) and children who received a remediation procedure of a type different from the initial induction (Cells 2, 3, 4, 6, 8, 9, 11, 12, 14, 16, 17, 18). There were no significant differences in expressions or self-reports of sad affect from any of these comparisons. These results are consistent with the prediction that facial expressive and self-report measures would be more reactive to the most recent induction or remediation procedures than would the cognitive and behavioral measures.

The significant differences reported above for facial expressions of sadness across various conditions tended to dissipate with time. By the time of the final taping of affective expression, following the performance of the

altruism task, few significant differences remained. The major finding at this point was that children who received a single negative induction still appeared significantly more saddened than children who received a same-process remediation procedure (M = 1.60 vs. 3.80, t = 2.32, df = 33.1, $p<.05$; Cells 1, 7, 13, 19 vs. 5, 10, 15, 20), while this was not the case when cross-process remediation conditions were examined (M = 2.51 vs. 3.8, t = -1.70, df = 23.8, n.s.; Cells 2, 3, 4, 6, 8, 9, 11, 12, 14, 16, 17, 18 vs. 5, 10, 15, 20).

Discussion

Type of induction and the effective remediation of affective states

Under certain conditions positive affect induction procedures were capable of remediating the behavioral, cognitive and affective consequences of negative affect induction procedures. As expected, this was most consistently true when the remediation procedure was of the same type as the induction procedure. There are several potential explanations for why the remediation or alteration of ongoing affective states may be most effective with a process-specific procedure. These invoke the salience of maintaining stimuli, differential maintenance processes, and differential content of maintenance processes.

First is the possibility that process-specific remediation may be more effective because the induction of a negative mood (either experimentally or in vivo) may sensitize the individual to certain classes of cues or stimuli that then become more salient than other stimuli. Because of the increased salience of such stimuli, the child may attend more closely to them and even seek them out (Mischel, Ebbesen & Zeiss, 1973) so that they become integral not only to the maintenance of that state but also of particular effectiveness for its modification. For example, a vicarious negative induction (E-O) may sensitize the child to certain stimuli that are associated with the negative affect, such as a distraught mother's facial expression, voice tone, or

general posture. These stimuli would then become, for a time, particularly salient features of the individual's immediate environment. In the present example, because of its ability to draw the child's attention, a positive affectively toned vicarious experience would thus comprise a more powerful remediating set of stimuli. Cross-process remediation procedures are not rendered ineffective according to this model but simply less effective since they do not draw and focus the child's attention as specifically as process-specific procedures.

Another possible reason for the increased remedial capabilities of process-specific remediation procedures is that such procedures may deal more directly with the processes that maintain the affective state. Affect maintenance processes other than the cognitive interpretation of events are currently a subject of speculation, and experimental efforts to define such non-cognitive processes are lacking (Ellis & Grieger, 1977; Zajonc, 1980). First, affective states induced in different ways may have different maintenance processes. For example, a cognitive induction focussed on another (C-O) may induce negative affect that is maintained by the child's rumination on the plight of another child and the affective consequences that child may suffer, while an experience that induces negative affect (E-S) may induce negative affect that is maintained by the individuals rumination on his own plight, hostile thoughts towards (in the present experiment) the rejecting child, auditory memories of the rejection, or memories of similar past experiences. A remedial process that deals most directly with the major maintenance processes for an ongoing state would almost certainly be most effective in eliminating the state, if only by a process of direct substitution of positive content and stimuli for negative.

Finally, the cognitive content of the processes that maintain affect may vary systematically with the type of inducing event. For example, in the present study the cognitive-self procedure may have induced affect that was

maintained by cognitive rumination about the subject's own sad lot, perhaps even some self-deprecating rationale for why another child would be so rejecting, or memories of a similar real life experience. By contrast, a negative vicarious experience (E-O) may induce negative affect that is maintained by covert images of the sad facial expression of a victim, auditory memories of the victim's tone of voice, or memories of the verbal content of a victim's cries for help or redress. A list of potential maintenance processes for the several types of affect induction procedures employed in the present investigation appears in Table 3. Due to the lack of experimental efforts to examine such maintenance processes, this list is highly speculative. Certainly, the list is also not exhaustive, and other processes may function to maintain these or additional types of affective experience. Clearly, attention to affect maintenance processes should be high on the agenda of future research in this area.

Insert Table 3 about here

An analysis that discusses maintenance processes for affective states of various types may aid in explaining why the cognitive-self inductions proved so difficult to remediate by any means. If the maintaining process for negative affect from a cognitive self induction is primarily rumination on the subject's own plight together with associated thoughts and memories (Bower, 1980; Bower & Cohen, 1982; Isen et al., 1978), then this internal focus on the self may decrease the child's attention to the external environment and reduce the salience of external, potentially remediating stimuli. In the present study, the cognitive-self remediation was to some extent external to the child, at least initially, since a positive version of the original induction story was told to the child, following which s/he was to dwell upon it.

Cognitive-self induced negative affect may also be resistant to remediation by internally produced positive cognitions about the self since a

number of investigations have shown that producing such internally generated positive cognitions is much more difficult for subjects in a negative affective state (Barden et al., 1981; Bower, 1980; Bower & Cohen, 1982). This interesting phenomenon may help to explain why people who suffer from clinical depression (well maintained negative affective states) so frequently demonstrate internally generated negative cognitions about the self to the virtual exclusion of positive ones (Beck, 1963; 1967). Because the individual is focused on internal negative cognitions, s/he is 1) less capable of focusing attention on external, potentially remediating stimuli, and 2) less capable of internally producing the positive cognitions that might alleviate the aversive affective state. Further experimental attempts to remediate negative affective states resulting from cognitions about the self are necessary to elucidate what self-initiated or externally-initiated procedures are most capable of effectively remediating such well maintained affective states.

Effects of different types of affect inductions on children's altruism

The results of the present investigation support the findings of earlier research that negative mood states significantly decrease children's altruistic behavior (Barden et al., 1981; Rosenhan et al., 1974). Explanations for this phenomenon have often focused on the mediational role of expectancies. Isen and her colleagues (Isen, 1970; Isen et al., 1973; Isen & Levin, 1972) have proposed that negative mood states decrease expectancies for future rewards and thereby increase the reward value of current resources. Thus, negative mood states increase an individual's feeling that s/he cannot afford to be generous in the present, because there is no expectation of receiving additional rewards in the future.

Such an explanation does not, however, present an adequate rationale for why children whose negative state was induced by a vicarious experience did not show significantly reduced altruistic behavior as did children whose

negative affect was induced by other means. A more plausible explanation for why these children were more altruistic than other saddened children concerns the relationship between mood states, attentional processes and behavior. As discussed above, different induction methods may have different or even multiple maintenance processes. Of all the processes studied in this investigation, the vicarious induction of affect seems most likely to evoke a fully external focus of attention because the maintenance processes for such affect are likely to include mental images and auditory memories of the (external) induction scene, with little internal rumination on one's own personal plight. Consistent with this, the altruism task also involves a specifically external focus on others who are somehow deprived or rejected (i.e., cannot participate in the experiment and receive pennies too).

Indeed, Hoffman (1975) has speculated that mood states in general may increase or decrease one's concern with the self and thus increase or decrease attentiveness and responsiveness to the needs of others. Thus, a child who is saddened by observing the plight of another may experience negative affect as a result but may not experience the increase in attention to the self that is characteristic of a child saddened via the cognitive-self or even the cognitive-other manipulation, which is still "internal" since it involves the subject's own cognitions and provides no external, visual cues that may assist in focusing attention away from the self and on to others.

An analysis of affective process differences that emphasizes maintenance processes may also help to explain why the altruism of children in two conditions of the present investigation did not differ, as might have been expected. Barnett, King and Howard (1979) found that children who dwelled upon self-produced negative cognitions about themselves were significantly less altruistic than subjects who dwelled upon self-produced negative cognitions about others. In the present experiment, there were no differences

in altruistic behavior as a result of cognitive-self and cognitive-other induction procedures.

This difference in findings is probably due to a methodological difference between the studies in the way affect was induced. In the Barnett et al. investigation, the children were asked to produce their own cognitions, to think about past memories of experiences in which aversive events happened to themselves or other children. In the case of self-produced cognitive-other inductions, the affect that results may be maintained by the richly-elaborated processes proposed earlier to be operative in the vicarious (E-O) induction of the present study. These processes include elements such as visual images of the victim's facial expressions, auditory memories of the victim's cries, and the verbal content of the victim's lament. By contrast, children in the cognitive-other induction of the present experiment were given a story concerning another child to ruminate about, were not provided with any elaborated maintenance cues of a visual or auditory nature, and were unlikely to generate them with any vividness or salience since they did not know the "other" child. Such elaborations were present, however, in the vicarious induction (E-O) of the present experiment. Thus, it is not surprising that similar differences were observed between the cognitive-self and cognitive-other inductions in the Barnett et al. experiment but between the cognitive-self and vicarious (E-O) inductions of the present investigation.

The picture that emerges is that the precise conditions under which an affective state is generated not only pose limitations on effective remediation procedures but also influence the behavioral consequences of a given affective state. It is compelling to think of emotional states primarily in terms of their valence (positive/negative/neutral) (Barden et al., 1981), their level of arousal (Masters et al., 1979), or, most recently, their focus of attention (Barnett et al., 1979; Carlson, Note 3). The present

findings suggest that factors may influence the effects of emotion on behavior, such as degree of elaboration inherent in the inducing experience (or potential for subsequent cognitive elaboration), or the similarity between the context in which affect is induced to the context in which a consequent behavior might be performed. Since affect is so often elicited under social conditions (cf. the theme of social rejection in the inductions for the current study), some of the parameters of emotional states may be important determinants of the social consequences of such states; but not of the cognitive consequences. The cognitive performance data in the present study are consistent with this proposal.

Clinical implications of experimental affect induction and remediation effects

The growing literature on the effects of experimentally-induced mood states indicates that children receiving a negative affect induction experimentally behave similarly to children identified as depressed. In the present study, children who received a negative induction showed significant decreases in performance on a block design task, decrements that are similar to those found for children psychometrically defined as depressed (Kaslow et al., Note 2). In addition, experimentally saddened children in a number of studies have been found to show such depressive features as cognitive impairments, sad facial expressions, and self-reports of sadness (Barden et al., 1981; Carlson, et al., 1983; Felleman, et al., 1983; Masters et al., 1979).

These findings suggest that affect induction procedures may offer a useful experimental analog to some features of clinical depression in children and, by implication, to the development of effective interventions. This same conclusion has been drawn with respect to the implications of mood induction studies for the understanding of clinical depression in adults (Goodwin & Williams, 1982). There is little question that experimental analog research

has contributed to the development of clinical treatment procedures (e.g., Bandura, 1969; Rimm & Masters, 1979) as well as to our understanding of children's normal personality and social development. With respect to the role of affective states in behavior and cognition, the focus of the present study was upon factors influencing the effectiveness of remediation procedures for negative affect that has been aroused in various ways. The results and their interpretation suggest that future research should focus upon two related issues, processes that contribute to the maintenance and remediation of affective states, and, by extension, the nature and development of effective control strategies (Masters et al., 1983) that children and adults may invoke for the management of emotional states in themselves and in others.

Footnote

1. Non-integer degrees of freedom are obtained by testing the homogeneity of variance assumption of Student's t-test and correcting for populations with unequal variances. The following correction formula for obtaining degrees of freedom offers more accurate probabilities than the more standard procedure of assuming homogeneity of variance:

$$df = \frac{[(s_1^2/n_1) + (s_2^2/n_2)]^2}{[(s_1^2/n_1)^2 / (n_1-1)] + [(s_2^2/n_2)^2 / (n_2-1)]}$$

Reference Notes

Note 1. Barden, R.C., Leiman, B., Garber, J. & Masters, J.C. The effects of affective states on remembrances of important life events in young children. Unpublished manuscript, Southern Methodist University, 1983.

Note 2. Kaslow, N., Tannenbaum, R., Abramson, L. & Seligman, M.E.P. Depression in children: An initial study from a learned helplessness perspective. Paper presented at the meetings of the Southeastern Psychological Association, Washington, D.C., 1980.

Note 3. Carlson, C.R. Children's emotions and their responses to social comparisons. Unpublished doctoral dissertation, Vanderbilt University, 1983.

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TABLE 1

Accuracy and Speed of Children's Cognitive Performance (#Correct / Time) as a Function of the Type of Initial and Remedial Affect Induction

First Induction	Second Induction - Remediation: C-S	C-O	Exp.	Vic.	COMPARISON (NO INDUCTION)	M
C-S	1 6.33 215.3	2 5.33 236.8	3 5.5 227.6	4 7.16 189.6	5 6.5 206.1	6.16 215.08
C-O	6 6.5 204.6	7 8.1 185.0	8 8.6 169.3	9 7.0 195.5	10 5.6 217.3	7.16 194.34
EXP.	11 7.8 185.5	12 6.1 223.6	13 7.3 194.6	14 5.5 228.0	15 4.6 228.5	6.26 212.04
VIC.	16 5.83 218.6	17 7.66 186.0	18 8.0 185.0	19 8.5 159.5	20 4.16 246.0	6.83 199.02
(NO INDUCTION) COMPARISON	21 8.33 203.1	22 7.5 190.3	23 8.5 175.5	24 8.33 163.0	25 7.0 191.0	7.93 184.58
M	6.96 205.52	6.94 204.34	7.58 190.40	7.3 187.10	5.57 217.70	

TABLE 2

Children's Altruism (Total Number of Pennies Donated) as a Function of the Type of Initial and Remedial Affect Induction

First Induction	Second Induction - Remediation: C-S	C-O	Exp.	Vic.	COMPARISON (NO INDUCTION)	M
C-S	1 2.00	2 1.5	3 1.6	4 1.6	5 1.6	6.16
C-O	6 4.6	7 5.1	8 4.5	9 8.6	10 .16	4.59
EXP.	11 2.5	12 2.0	13 9.3	14 9.3	15 2.5	5.12
VIC.	16 9.1	17 8.0	18 8.0	19 8.83	20 3.3	7.44
(NO INDUCTION) COMPARISON	21 4.5	22 6.5	23 8.0	24 7.3	25 4.83	6.22
M	4.54	4.62	6.28	7.13	2.48	